

ТЕХНОСФЕРНАЯ БЕЗОПАСНОСТЬ, ЭКОЛОГИЯ

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**ИЗУЧЕНИЕ ФАУНЫ И ЭКОЛОГИИ ПРЯМОКРЫЛЫХ НАСЕКОМЫХ
АЛМАТИНСКОЙ ОБЛАСТИ (ЮЖНЫЙ КАЗАХСТАН)**

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Аннотация: Ценность проведенного исследования. Изучение фауны и экологии прямокрылых насекомых Казахстана и отдельных его регионов имеет огромное теоретическое и практическое значение. Среди прямокрылых насекомых есть немало потенциально опасных и вредных для сельского хозяйства видов. Юго-Восток Казахстана и в частности Алматинская область, Ескелдинского района является территорией, в которой неоднократно наблюдались вспышки массового размножения саранчовых. В статье приводятся материалы по фауне и экологии прямокрылых насекомых (Orthoptera) Алматинской области, Ескелдинского района выявлено 6 типовых биотопов: 1 – пастбища (22 видов саранчовых, из них 10 вредных); 2 – сенокосы (8 видов, из них 3 вредных); 3 – многолетние трав (14 видов, из них 7 вредных); 4 – полынно-разнотравные участки (15 видов, из них 6 вредных); 5– степные участки (20 видов, из них 9 вредных); 6– залежи (17 видов, из них 9 вредных);

За период исследований проведено 32 учета в 6 типах местообитания и собрано 2800 особей личинок и имаго саранчовых. Проведено 32 опыта в полевых и лабораторных условиях по изучении вредоносности нестадных саранчовых.

Ключевые слова: сельское хозяйство, род, биотопы, фауна, саранчовых.

**STUDY OF THE FAUNA AND ECOLOGY OF DIRECT-INSECTS IN THE ALMATY
REGION (SOUTH KAZAKHSTAN)**

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Abstract : *The value of the study.* According to the nature of the distribution of various habitats across the territory of the Almaty region, the Eskedinsky region, 6 typical biotopes were identified: 1 - pastures (22 species of locusts, 10 of which are harmful); 2 - hayfields (8 species, 3 of them harmful); 3 - perennial grasses (14 species, 7 of them harmful); 4 - wormwood-herbage (15 species, 6 of them harmful); 5 steppe plots (20 species, 9 of them harmful); 6 - deposits (17 species, 9 of which are harmful);

During the study period, 44 counts were taken in 13 habitat types and 6,100 individuals of larvae and adult locusts were collected. 32 experiments were conducted in field and laboratory conditions to study the severity of non-plant locusts.

Keywords: agriculture, genus, biotopes, fauna, locusts.

Introduction: The choice and relevance of the topic. Locusts are widely known in the world as insects. They are dangerous for crops and pastures. They are also an unhealthy majority of the living world. In the present time, in Kazakhstan there are more than 270 species, from 10 to 12 species live in the suburban pheasant dungeons, pastures and pheasants.

Locusts are widely distributed in desert, steppe, forest-steppe regions of Kazakhstan. Harmful hillsides in these areas are locusts: *Arcyptera microptera* F.- W., *Aeropus sibiricus* L., *Oedaleus decorus* Germ., *Dociostaurus brevicollis*, *Chorthippus albomarginatus* Deg., *Stenobothrus fischeri*. and many other types.

The locusts have been proven in dozens of scientific publications in crop cultivation, hayfields and pastures, with dozens of square meters per square meter, and some of the harmful species during the drought years.

Overview of scientific literature: Numerous scientists have studied the permanent and temporary foci of *Calliptamus italicus* locusts in the northern and northern (western and eastern) steppe regions (Azhbenov, 2000: 16).

Based on the analysis of the spread of this locust, it has been established that during the last 34 years in the republic the largest amount of anti-seizure measures against the Italian locust (Azhbenov 2001: 25)

Materials and methods of research: The number of locusts in the fescue-wasteland (2117 units per 1-hour collection) was the priority. *Dociostaurus brevicollis*, *Calliptamus italicus*, *Oedaleus decorus*, *Chorthippus albomarginatus* Deg. *Stenobothrus fischeri* Home. often encountered malignant species. And *Stauroderus scalaris*, *Podisma pedestris* L. species were somewhat different (Vasenko 2000: 36).

During the massive increase of locusts, chemical processing of hundreds of thousands of hectares of land was carried out in Kachiry area of Pavlodar region for one year. 22 species of locusts are known to be among the most dangerous species in this region (Dublanajova 2001: 28), including

the Italian grasshopper, black lane, cross, atbarsar, wingless, white lane, Submarine, Fisher and Siberian hordes.

In addition, from 1997 to 1998, there was a large number of malevolent Atbasar, Submersible, Siberian, Cross, White and Black winged locusts. The locusts have been particularly devastating in some years than the Italian locust. In this area 4553.6 hectares of land were examined and 1049.6 hectares of land were damaged by locusts (Zhasanov 2000: 13).

In different years, these anti-pest control measures were carried out in the agricultural land in the amount of 1-2 million hectares (Jasanov A. 2001: 170).

Especially because of the massive increase and rapid development of the number of Italian leopards in 1996-2000, there were 7.5 mln. he resorted to safeguard measures (Jasanov 2003: 27).

In the Pavlodar region Irtysh region, 29 species of locusts have been identified from steppe pastures or untreated virgin lands. 9 of them are classified as economically significant pests (Kambulin, 1995: 634).

At the same time, the fauna of the residents is largely due to the average condition of the regions for each year and to the development of agricultural lands (Kambulin, 1997: 9).

In the Besköl district of the North Kazakhstan Oblast, the meadow biotope has been divided into seasonal periods, determining the quantity and productivity biomass. The most prevalent species of hay biotope were Chorthippus albomarginatus, Arcyptera microptera, Glyptobothrus biguttulus, Dociostaurus brevicollis, with an average area of 2,6-5,5 pcs / m². In the beginning of June, the locust cultivation was 2.5 pc / m², in mid-July it increased by 4 pcs / m², in August it was 0.75-3.2 pcs / m². Meanwhile, the average harvest yield was 1.4-2.5 kg / ha at the beginning of June, down to 6.6 kg / ha by the end of this month. (Kambulin, 1995: 634). One of the most dangerous species in the Akmola region is the Italian grasshoppin, and in 1999-2000, in all regions of the region. And mainly in the dry areas (Kambulin, 1998: 10).

Numerous scientists have studied the species composition, biology, ecology and economic peculiarities of locusts living in the regions of Kazakhstan. B. Lachinsky and many others (Lachinsky 2002: 387).

In 2001, in the study of fauna and ecology of locusts, 33 species were identified in Irtysh area of Pavlodar region. According to the results of the analysis of locusts, due to the locusts and meeting of the locusts. K. Childebaev divided them into 3 groups: 1-frequently encountered species (priority index over 10%); 2-one normal species (1-10%); 3-one species (1% lower). In all the typical locations in this region there were varieties of Calliptamus italicus, Dociostaurus kraussi Ingen., Myrmeleotettix pallidus (Childebayev, 2002: 268, Childebayev 2001: 83).

Calculations (Experimental part): The number of locusts per square meter was determined by counting the four-rectangular (frame), route-transect method and locust locks. The average number of locusts was determined by dividing their total number by calculations.

The size of the checked area is determined by the following formula:

$$P = \frac{a \times b \times c}{1000},$$

here P- the size of the tested area, hectare;

a - number of computing sites;

b - distance between computing sites m;

c - distance between routes m.

Four rectangular shapes have been calculated for the number of locusts 0.5 x 0.5 m (0.25 m²) inside the rectangular shape. The calculations were conducted for 2 hours without interruptions. The average number of locusts per square meter was determined by dividing the total number of pests taken into account.

Locusts were calculated by the route-transect method. The plants in the seeds were classified and the rarest was 4 m, while the height of the plants (1-2 m) was 2-3 m.

Increase the extent of the explored space on the route.

The number of locusts in the area of 1 hectare is determined by the following equation::

$$D = \frac{A \times 10000}{B \times C},$$

here: D- average number of adult wood per hectare;
 A- total number of pistachios along the route, pcs;
 B- total length of the route, m;
 C- route width, m.

The frequency of views was calculated in percentage:

$$P = \frac{n \times 100}{N},$$

here: P- frequency of meeting, %;
 n - the number of samples that have been encountered;
 N- total number of samples.

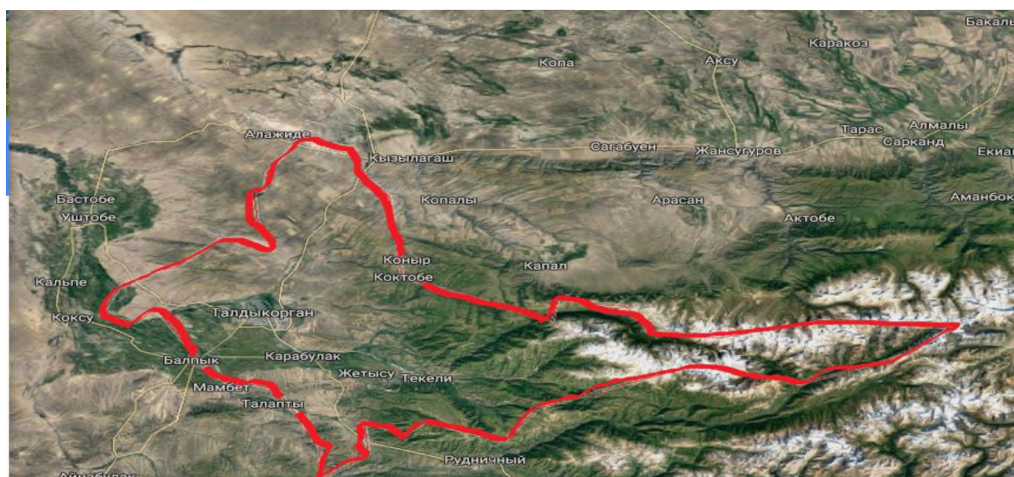
The types of locusts that dominate have been identified:

$$D = \frac{k \times 100}{K},$$

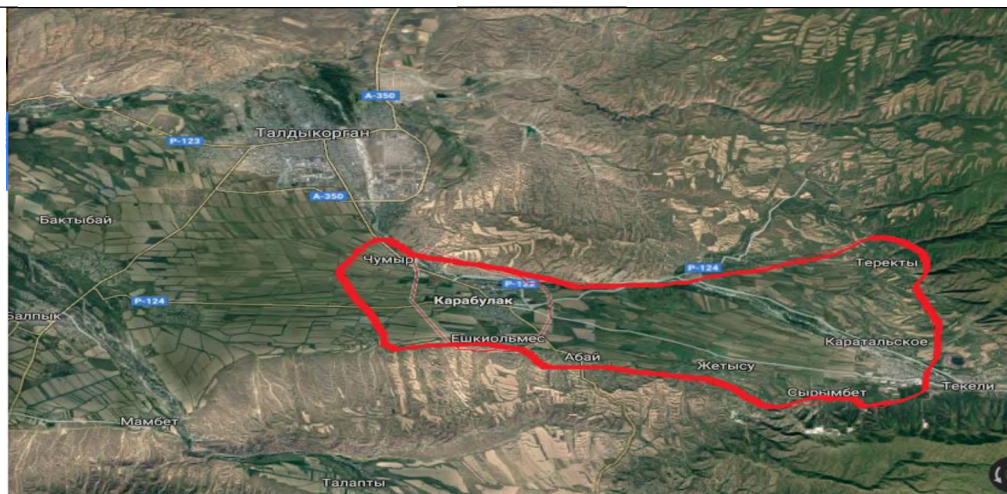
here: D – species priorities, %;
 K – the types of tree predominance, pcs;
 k – the advantage of one, pcs.

Results and discussion: The settlement of Eskeldinsky district is located in the crossroads of the Koxsu depression and Zhetysu (Dzhungar) Alatau, which is mainly divided into two parts. The eastern part of the district is made up of the highest mountain ranges of snow and ice, with the highest altitude (4016m).

In the years when the climate was warm, the northern slopes of the Dzungarian Alatau kept cold. The average air temperature is 8.6-8.9 ° C. The average January temperature is 9,2-11,7 ° C, the average July temperature is + 24,4 ° C. A pleasant temperature range of 3950-4050 ° C, vegetation activity is 3650 (3-3.5 months). The highest temperature in summer is + 42 ° C. The frosty period lasted 160-170 days. Spring frost will return in the second half of April. In autumn frost falls in early October. Precipitation is 130-230 mm.



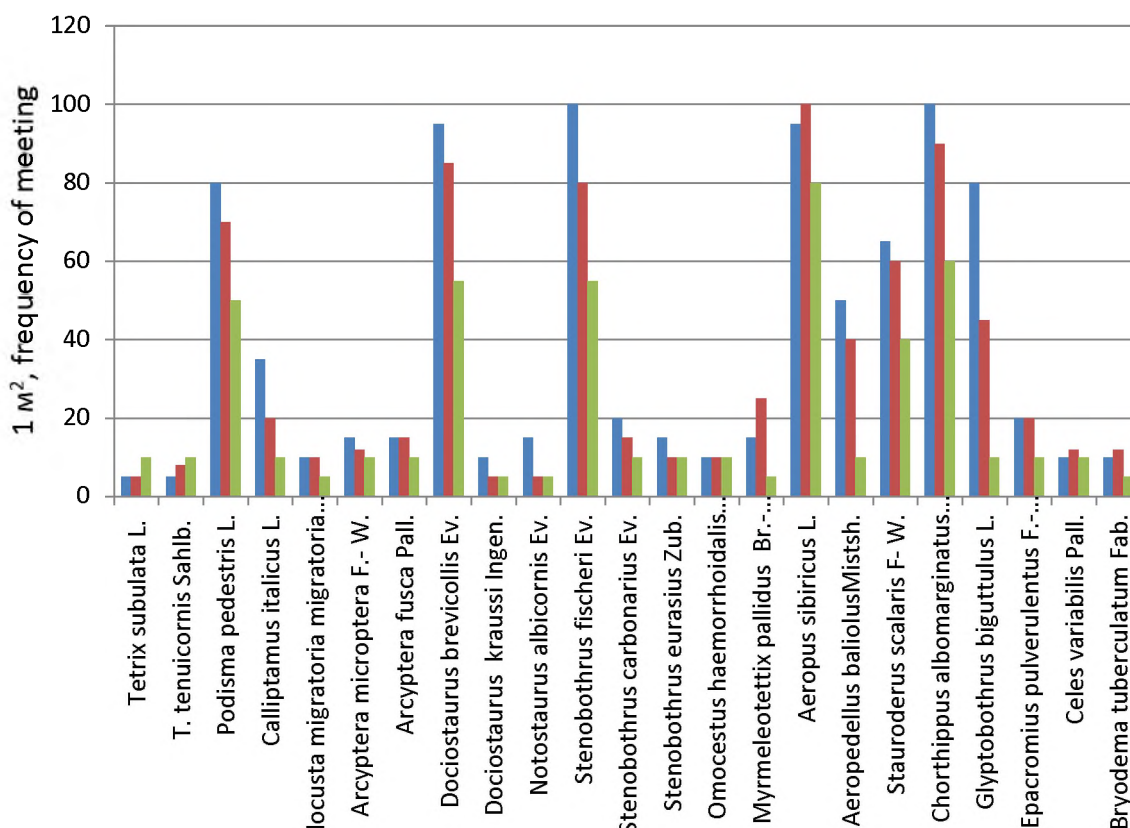
Picture 1. Map of Eskeldi District



Picture 2. The study area in Eskeldi district

Detection of locust species in the steppe zone of Almaty region was mainly carried out on a routine and route basis. From the typical 6 locust grabs, the number of locusts (grown-ups and adults) has reached 2,800. Of these, 2 families and 24 species of 18 relatives were identified.

24 locust species were identified in the Eskeldi district. Among these species are locusts: Siberian (*Aeropus sibiricus* L.), wingless (*Podisma pedestris* L.), White Lane (*Chorthippus albomarginatus* Deg.), Fisher Cheetah (*Stenobothrus fischeri* Ev.) And Subspecies (*Dociostaurus brevicollis* Ev.). At the same time, there were a number of species with a high-tech Italian chewing gum (*Calliptamus italicus* L.), a grasshopper (*Arcyptera microptera* F.- W.) and black winged locust (*Stauroderus scalaris* F.- W.) (1-picture).



Picture 3. Type of locust and frequency of locusts (Eskeldinsky district of Almaty region, area 2016-2017)

Summary: Route surveys from the steppe regions of Abai, Zhetysu, Terekty, Syrymbet, Shimyr and Eshkiyolmes villages of Eskeldinsky district of Almaty region in 2016-2017 were conducted in June, July and August. Depending on the location of locusts, 6 typical biotopes have been studied: 1 - pasture (22 species, 10 harmful); 2-meadow (8 species, 3 harmful); 3-perennial herbs (14 species, 7 harmful); 4-meadow-wormwood-mixed herbs (15 species, 6 harmful); 5-field areas (12 species, 5 harmful); 6th place (10 species, 6 harmful); from biotopes. Among these species are *Dociostaurus brevicollis*, *Stenobothrus fischeri*, *St. eurasius* and *Chorthippus albomarginatus* have the advantage. The number of locusts has grown and grown in grain and wormwood. And *Arcyptera microptera* was dominated by fescue-mixed herbs. One of the most harmful species in the region was the Italian leopard, as well as the red winged, wingless and pigeon-go-round locusts in a fox-mixed herb. Frequently, the barabin, inhabited by grazing and hayfields, was rarely found on cereals-wormwood herbs (3-graph).

3- graph. The growth of locusts in biotopes

№ p/ s	Types of locusts	All, pcs	Percentage of locust meeting indicator, (%)					
			biotopes					
			1	2	3	4	5	6
1	<i>Tetrix subulata</i> L.	25	-	8,8	-	-	-	1,1
2	<i>Tetrix tenuicornis</i> Sahlb.	33	5,0	-	-	-	2,2	-
3	<i>Podisma pedestris</i> L.	220	4,0	-	4,0	-	-	12,7
4	<i>Calliptamus italicus</i> L.	93	3,0	-	5,5	-	3,2	-
5	<i>Locusta migratoria migratoria</i> L.	25	2,0	6,0	-	3,2	-	-
6	<i>Arcyptera microptera</i> F.- W.	69	2,0	-	-	5,5	-	-
7	<i>Arcyptera fusca</i> Pall.	85	5,1	-	3,2	-	5,5	-
8	<i>Dociostaurus brevicollis</i> Ev.	390	18,2	16,3	13,2	13,2	13,2	3,7
9	<i>D. kraussi</i> Ingen.	58	2,0	-	6,8	6,8	6,8	-
10	<i>Notostaurus albicornis</i> Ev.	55	3,0	-	-	4,0	-	-
11	<i>Stenobothrus fischeri</i> Ev.	401	2,1	22,5	15,6	14,6	20,6	22,6
12	<i>Stenobothrus carbonarius</i> Ev.	28	1,6	-	3,2	3,2	4,2	-
13	<i>Stenobothrus eurasius</i> Zub.	68	1,1	12,0	6,4	6,4	-	-
14	<i>Omocestus haemorrhoidalis</i> Charp.	20	2,0	-	-	2,0	4,0	-
15	<i>Myrmeleotettix pallidus</i> Br.- W.	33	1,5	-	6,1	-	-	6,5
16	<i>Aeropus sibiricus</i> L.	35	1,1	-	5,0	5,0	-	-
17	<i>Aeropedellus baliolus</i> Mistsh.	62	1,3	-	-	6,1	6,1	-
18	<i>Stauroderus scalaris</i> F.- W.	75	1,4	-	7,8	7,8	7,8	10,5
19	<i>Chorthippus albomarginatus</i> Deg.	415	22,0	22,0	15,0	15,0	22,0	6,8
20	<i>Glyptobothrus biguttulus</i> L.	203	10,1	12,6	-	-	5,0	10,8
21	<i>Epacromius pulverulentus</i> F.- W.	220	6,0	22,8	-	-	-	19,5
22	<i>Celes variabilis</i> Pall.	57	2,9	-	2,0	2,0	-	-
23	<i>Oedipoda miniata</i> Pall.	90	-	-	6,2	-	-	5,8
24	<i>Bryodema tuberculatum</i> Fab.	40	4,1	-	-	5,2	-	-
All:		2800	100	100	100	100	100	100

Note: 1 - pasture (22 species, 10 harmful); 2-meadow (8 species, 3 harmful); 3-perennial herbs (14 species, 7 harmful); 4-meadow-wormwood-mixed herbs (15 species, 6 harmful); 5-field areas (12 species, 5 harmful); Places 6 (10 species, 4 harmful).

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